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## NOTES ON THE ORNITHOLOGY OF THE BRITISH POLAR EXPEDITION, 1875-6.

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Naturalist on Board H.M.S. 'Discovery.'

GREENLAND FALCON, *Falco candicans*, Gm.—Upon the 16th July, 1875, I saw a bird of this species leaving a "loomery" in Svarte-vogel Bay, near Rittenbank, lat.  $69^{\circ} 42'$ , with a bird in its talons. Afterwards, on August 19th, 1875, I watched a pair for some time circling around their eyrie amongst lofty cliffs near Cape Hayes, lat.  $79^{\circ} 44'$ . They alighted several times, but scarcely descended below their inaccessible breeding-place, about a thousand feet above the ice-foot where I stood. Their wide flights and spreading gyrations were quite like those of the Peregrine Falcon under similar circumstances, but, unlike that bird, they maintained silence. At the end of May, 1876, a bird was seen to alight on a snowy bluff, about three hundred yards from the ship, in Discovery Bay, lat.  $81^{\circ} 42'$ . It was watched through a glass for some minutes, but flew away when a gunner attempted to approach it. From the description given to me afterwards I concluded it could only be a Falcon. On the homeward voyage Falcons were several times seen; on August 21st, 1876, at the breeding-place of last season, and several times about the ship in September; upon the 17th one perched on the fore-royal truck when near Proven, lat.  $72^{\circ} 20'$ . The last Falcon I saw was at Godhavn on September 25th, 1876.

SNOWY OWL, *Nyctea scandiaca*, Linn.—We saw no Snowy Owls until reaching Discovery Bay; they were abundant there from

May till the end of July and the beginning of August, when, having reared their young, the majority went southwards. I am inclined to believe some remain in the vicinity of Discovery Bay throughout the winter. Their food is almost exclusively the Lemming, which is always to be had in abundance, and the following extracts from my journal will show that owls can exist in these latitudes, independently of the extreme changes in light and temperature:—

“October 22, 1875. Hans, our Esquimaux hunter, saw an owl kill a hare, and had nearly devoured it, flying off, when he disturbed it. The temperature was then  $-29^{\circ}$  Fahrenheit, and the sun had been below the horizon at midday for a week. This was nearly three months after their regular migration had taken place.”

“February 29, 1876. I found a freshly-discharged pellet upon the snow, with some blood and a portion of a Lemming's entrails close by; in a day or two these would have been covered by the light drifting snow. The temperature was  $-59^{\circ}$  Fahr. The pellet was entirely composed of Lemmings' bones and fur.

“March 2, 1876. An owl was seen by Hans. The mean temperature of the day was  $-63.4^{\circ}$  Fahr. This was the coldest week we experienced.”

Snowy Owls were noticed in pairs from the 18th May onwards. The first nest was found on June 15th, and contained nine hard-set eggs. Upon this occasion, and a few others, there was a pretence for a nest of hay and some of the owl's feathers; as a rule, the eggs were laid upon the bare earth, often with a surrounding of snow. As early as the 17th June I saw a young one able to fly, its plumage being of a dark greyish black. Within fifteen miles of the ship there were found no less than twenty-six nests of the Snowy Owl, and as many as four within an area of one square mile; of these I observed six to contain nine eggs each; eight had eight eggs each; while the rest were not discovered till some young had flown; nine was, however, the maximum number of eggs observed. It is usual, when the season has advanced, to find young of different ages and eggs in the same nest, a week or more elapsing from the time of laying the first egg till the full number has been completed; no doubt the parent cannot leave its eggs unprotected in consequence of the extreme cold. The eggs are almost spherical and of a snowy whiteness;

those gathered by me were never discoloured except when addled or containing young; one or two addled eggs occurred in every nest, and these were left entire after the young had flown. When an owl's nest is approached closely the male bird flies at the intruder's face, snapping its beak loudly and quickly, and swerving off so closely as to let one feel the wind from its wings. At these times the bird is a splendid sight, its large yellow eyes blazing with rage as it swoops down at an angle of about forty-five degrees from a distance of thirty or forty yards straight for the enemy's face. The final swoop of the male was always made when the nest was discovered, and upon one or two occasions the bird fell a victim to its daring from a blow of the gun-barrel. While this was going on the female, who is generally flying around or seated at a safe distance, keeps up a loud, angry screaming. The other cries of the owl were a deep note, half "coo" and half "hoot," which is made by the male when a stranger approaches the breeding-place, and a deep "quack," which the female makes when she first leaves the nest. After a little practice one can interpret these notes so as to discover the nest without any difficulty. The eye of the Snowy Owl is very beautiful, the pupil black, the iris broad and golden yellow, with an outer ring of black. The flesh of the Snowy Owl is white and of a delicate flavour, the skin being extremely thin and difficult to preserve. A pinioned adult male, captured during the breeding season, and kept in confinement, refused all food and died in a few days. Many young were reared, and a few lived till we reached the Atlantic, but none survived the passage.

The very old male is pure, unspotted white throughout, and remains so throughout the summer. Females and young males are more or less spotted with reddish or greyish brown, especially upon the wings and wing-coverts; the latter feathers are the latest to become white. The males become less spotted as they advance in age; but of a pair the male is always the least marked, the female never, I believe, becoming purely white. The male owl takes great care of his mate while hatching, laying by her side a store of lemmings in tempting array; six to a dozen was a common provision, but in one case as many as twenty-seven lemmings and the remains of a full-grown hare were arranged around the nest containing young and eggs. I have seen these supplies surrounding the nest containing eggs alone. It will be

seen that upon two occasions I found the Snowy Owl feeding upon other food besides lemmings. Another instance was noticed by the Rev. C. Hodson, the Chaplain of our ship; he had wounded a Brent Goose, and while following it an Owl pounced upon the bird and tumbled it over and over. I have several times watched the Long-tailed Skua, *Lestris parasiticus*, harassing an Owl in a most insolent manner, flying at its head while seated in majestic indolence, flapping its wings and tail in its face, and screeching discordantly close to its ear, while the Owl preserved a dignified composure. Nor is the Skua the Owl's only enemy. Once I found the shells of freshly-devoured owls' eggs, while a quantity of Fox's fur attested to a severe conflict. Another time a Wolf, which was seen to leave the floe and make inland, was tracked and in his path were found the wings and tails of a brood of young owls, which he had found time to devour on his way.

From the middle of May Snowy Owls kept arriving, and by the middle of June they were breeding in numbers. By the beginning of August they had nearly all disappeared. Their residence at their breeding-quarters is thus about two months and a half, and this is rather more than the stay of most other species. Snowy Owls appear to have been by no means common in Polaris Bay, lat.  $81^{\circ} 40'$ , but Dr. Coppinger saw and gathered their pellets in several places. The following measurements will show the dimensions of a freshly-killed Arctic specimen, a female shot June 16th, 1876:—Entire length, 24 inches; length of tarsus, 2.10 in.; length of bill along ridge, 1.11 in.; length from rictus to outer edge, 1.10 in.; length of middle toe, 1.7 in.; length of claw on curve, 1.5 in.; length of tail past wing, 1 in.; extent of wings, 58 in. First quill 1.10 inch shorter than second; second, 4 inches shorter than third; third equalling the fourth, and third and fourth longest.

WHEATEAR, *Saxicola oenanthe*.—I saw Wheatears along the shores of Svarte-vogel Bay, and again at Proven; in each case a pair, and evidently breeding.

SNOW BUNTING, *Plectrophanes nivalis*.—This was the most universally distributed bird along the shores we visited. Its friendly and cheering song at once renders it a favourite with the Arctic traveller. Its notes are varied, sweet, and lively. The common cry is the single plaintive tone of the Yellowhammer, while its song reminds one forcibly of the Whitethroat and of the



Sedge Warbler. The male, too, will sing while hovering on the wing, when notes of the Green Linnet and Hedgesparrow are exactly reproduced. At Disco, lat.  $69^{\circ} 15'$ , I found two nests; both were inaccessible, one being high up upon a ledge on a precipitous cliff, and the other out of reach in a cranny in a rock. The parents fed their young as I stood watching a couple of yards off; they showed no alarm whatever. The young, four in number, were covered with a very dark down. The parents, if watched, will always betray the whereabouts of their nest. At Disco I met with Snow Buntings at an altitude of 3200 feet above sea-level; there were a couple of birds, and I observed no other instance of animal life at so great a height in high latitudes. Upon the 29th September, 1876, Snow Buntings had left Egedesminde, lat.  $68^{\circ} 40'$ . They were met with all along the coast to Discovery Bay, where they remained till the first week of September, 1875; after which they disappeared. In the following year I first observed them at Polaris Bay, upon the 15th May, when a flock of eight came down along shore from the northward. On the following day more arrived from the same direction; they had appeared a few days previously at Discovery Bay, upon the opposite coast. By the 20th June they were hatching their eggs; four nests I found in our winter quarters contained respectively, one, three, and (in two cases) seven eggs each. Young birds had flown from the first two, so that seven appears to be the usual number of eggs. The nests were snugly built of dry grass, lined with owls' feathers usually, but sometimes geese feathers and musk-ox wool were used. The eggs are of a greenish grey ground-colour, the size and shape of a Yellow-hammer's, with blots of a reddish chocolate-brown hue, more numerous at the larger end, and mostly oval and directed lengthwise upon the shell; there are few streaks, and none of the bold, fanciful markings met with on the eggs of our British Buntings. The plumage of the earliest seen Snow Bunting in 1876 was as follows:—Breast, head, abdomen, tail-coverts, and secondary wing-feathers, white; other wing-feathers, black or flecked with black; back-feathers and wing-coverts, brownish black, toned off to the end with reddish brown. The chief food of Snow Buntings seems to be the flower-heads and seed-tops of *Drabas*, *Papaver nudicaule*, &c.; earlier in the year they subsist on the budding leaf-shoots of *Saxifraga oppositifolia*. I have also watched them

picking up caterpillars. Dr. Coppinger informed me that Snow Buntings were common in Polaris Bay throughout July, 1876.

LAPLAND BUNTING, *Plectrophanes lapponica*.—Far less numerous than the last species, and I did not meet with it north of Disco; there, however, I observed several pairs. This bird is more silent and retiring than the Snow Bunting, and its song is more subdued and plaintive, at times much resembling that of the Redbreast. On the 10th July I found a nest of this species by the little lake at Blase Dalen, in Disco, with four young. The nest was composed of dry grass and small twigs, deep, and lined with hair and feathers; it was placed in an under-growth of *Salix arctica* and *Archangelica officinalis*, about a foot and a half above the ground. The young were clad with a dark down. The female parent suffered herself to be lifted from the nest and replaced without attempting to escape, while the male kept up a continual angry chattering, flying almost into my face.

RAVEN, *Corvus corax*.—On the 13th July, 1875, I saw a pair of Ravens at Englishman's Bay, in Disco; they had a breeding-place to the west of that near the shore. On the 4th September, 1876, I saw a pair at Lyell Bay, lat.  $79^{\circ} 32'$ , and on the 30th and following days they were very numerous at Egedesminde, where they live upon shell-fish, dead fish, and other sea-shore garbage. They are protected there, as they are invaluable scavengers. Seven or eight of these birds pursued one of our Discovery Bay Esquimaux puppies, which I endeavoured to bring home to England, and drove the terrified animal into the water, pecking at its eyes and buffeting it about the head with their wings. In the middle of July, 1876, a pair were constantly seen about Polaris Bay; they had their nesting-place at Cape Lubton, a little to the northward. This appears to be the most northern settlement of the Raven.

ROCK PTARMIGAN, *Lagopus rupestris*.—On the 7th July, 1875, I saw one Ptarmigan at Disco. Having no gun the bird escaped, though admitting of approach within a couple of yards; this was at an altitude of about 2000 feet, and the bird was snowy white. Ptarmigan were subsequently obtained, or observed, at various points between Disco and Discovery Bay. The southern shores of Hayes Sound seemed perhaps the best adapted places for their support. With the exception, perhaps, of the Snowy Owl, the present species appears to be the hardiest northern

bird: on October 10th, 1875, I shot one in Discovery Bay, and as late as the 12th a flock of five was seen flying southwards. The following is a description of the specimen, a male, of October 10th:—All the plumage white, with the exception of under tail-feathers; a patch around either eye, which extended from base of bill; and the shafts of the first five or six wing-feathers, which were black. There was also one brown and white feather in each rank of secondary wing-feathers. A patch of orange-coloured skin was exposed above the black feathers over the eye. The crop contained a considerable quantity of willow-tops (*Salix arctica*), withered flowers and capsules of *Pedicularis hirsuta*, shoots of *Stellaria longipes*, and leaves of *Dryas integrifolia*. Willow-tops predominated, and the examination of a number of specimens led me to conclude that that is their favourite, and often their exclusive food. In 1876, on the 5th March, Hans saw fresh Ptarmigan-tracks, and on the 30th individuals were seen. On the 7th April a male was shot in snowy white plumage, save two mottled breast-feathers. On the 10th April I took the following description of a female I shot in Discovery Bay:—Snowy white with the exception of a black patch on either side reaching from upper mandible under the eye to half-an-inch behind it. Reddish orange streak above the eye conspicuous. Tail-feathers fourteen, black, with white tips which disappeared in the outer ones; these were surrounded by six white tail-coverts equal, or nearly so, in length; the black feathers show conspicuously in a flight over the snow, rendering the bird, which would otherwise be very difficult to distinguish, an easy mark for the gunner. The third and fourth wing-feathers are the two longest, the third the longest of all. Two mottled feathers appeared on the breast. The nails black and the hair-like toe-feathers reaching nearly to their extremity. Bill black and broad. Shafts of first six wing-feathers brown. Weight, 1 lb. 7 oz. Total length, 15 inches; of tail, 5 in.; of wing, 8·5 in.; of bill to rictus, 1 in.; of tarsus, 1·3 in.; of middle toe, 1·1 in.; of middle nail, ·7 in.; of bill, above, ·7 in. On the 17th June I shot a hen Ptarmigan in the full mottled-brown summer plumage. On the 27th I shot a male in perfect winter plumage, except for one or two minute brownish feathers on the top of the head. On July 27th and August 2nd, Ptarmigan were shot in partial plumage; these were both

females. One which had been hatching had all the feathers mottled-brown without white, except the primaries and first half of the secondaries, which were pure white. There was some white also upon the wing-coverts. The males seem to change less in summer, and the old males, as in the case of the Snowy Owl, hardly at all. On the 10th May, 1876, I noticed Ptarmigan-droppings at Polaris Bay. Dr. Coppinger did not observe this bird there during the previous July.

TURNSTONE, *Streptilas interpres*.—On the 25th August, 1875, Turnstones, young and old, were collected in small flocks preparatory to leaving Discovery Bay. They were then feeding along the shore, all their means of subsistence inland being frozen up. In 1876 two or three Turnstones arrived on the 29th May; on the 5th June I shot a male in beautiful summer plumage; by the 6th and 7th they were of frequent occurrence, and I saw a few passing to the north in small flocks. The Turnstone, like all other birds in Discovery Bay, is always at war with the Long-tailed Skua, flying at and insulting him with great courage. Turnstones, though feeding along shore at the close of their visit, subsist during the summer upon bees, caterpillars (*Argynnis chariclea*, Sch., and *Dasychira grænlantica*, Wocke), and Tipulæ. The stomachs of several examined were almost entirely filled with caterpillars, and I often watched them with a powerful glass and wondered at their dexterity in finding them. The summer note of the Turnstone is loud and pleasant: a twittering chatter of two notes quickly repeated, which is produced by the male bird while watching near the nest. On the 12th and 24th July, 1876, two nests were found with four eggs each; on the 1st August I saw a brood of four young, just able to fly; on the 6th there were many young about, and by the 9th they were feeding in small parties along the shore. The first nest was found by one of the sailors in a valley about three miles inland; by my instructions he left it untouched for me to see *in situ*; but, having taken insufficient bearings, when we returned together, he could not re-discover it. The ground was covered with a uniform grey shingle with scattered patches of brown herbage. For upwards of an hour did we cross and re-cross an area of about fifty square yards, within which limits my companion was positive that the nest was placed, the parents flying round in much agitation all the time. At last, in despair



of thus finding the eggs, and fearful, moreover, of treading on them, I withdrew to a hillock about a hundred yards off, and watched the female through my field-glass, the male having deserted his post when he thought we had left. After a few minutes she alighted, and while watching her threading her way for about ten yards among the stones, to my delight, four eggs came within my field, and in another second she was between me and them. Even then, so exactly did both eggs and parent resemble their surroundings, it was with difficulty we could see the nest, and, even while actually looking at the eggs, it was hard to distinguish them from the pebbles and herbage around. The nest was composed of white lichen and *Dryas*-leaves, loosely laid together upon a hollow in a tuft of the latter. The eggs were rather pointed, and in colour and marking like those of the Long-tailed Skua, with the ground-colour less greenish in shade. In Polaris Bay Dr. Coppinger observed Turnstones frequently in July, 1876.

(To be continued.)

#### ORNITHOLOGICAL NOTES FROM THE COUNTY MAYO.

By ROBERT WARREN.

THE cold wet summer of 1879 appears to have been, in this locality, almost as disastrous to our smaller summer visitants as the previous winter was to our residents and winter visitants. According to the register of the rainfall for 1879, kept at Markree Castle, County Sligo, by Colonel Cooper, there fell during the first quarter of the year, 8.73 in.; in the second, 9.61 in.; the third, 15.68 in.; and in the fourth, only 5.20 in. This immense rainfall, together with the unusually low state of the temperature, had, as might be expected, a most depressing and injurious effect on many of our summer birds, more especially on the Willow Wrens, Whitethroats, Chiffchaffs, and Spotted Flycatchers; so much so that I never remember hearing so few of the males singing in our plantations and hedgerows; and it was on very few occasions indeed that one heard them singing in as strong and joyous a strain as they usually do.

I did not hear a Willow Wren until the 29th of April, nine days later than in 1878, and fourteen days later than in 1877,

and the song sounded weak and poor; Spotted Flycatchers did not appear until the 30th of May, three weeks later than last year; nor were Whitethroats heard until the same date, also three weeks late.

Very few of these small birds appear to have succeeded in rearing their young, chiefly owing to the cold and excessive wet weather at the time of hatching, adding the eggs in some nests, and killing the weakly young in others. Several broods of the Spotted Flycatcher have been reared close to the house every season for some years past, but last summer I do not believe that a single brood was reared, for during the entire season their alarm-note was never heard—a call that surely gives notice that the young are hatched; and, in further proof of the failure, I watched two nests (one on an elder tree in the garden, and the other in some ivy on a part of the house) which the birds deserted, leaving addled eggs in each, after sitting longer than usual.

Willow Wrens were scarce, and I remarked no increase in their numbers as the summer advanced, missing the little family parties that are usually seen flitting about the plantations and woods. The Whitethroats also appeared unusually scarce in our hedgerows, and very silent throughout the summer. One solitary male Chiffchaff remained about the place the whole summer, but I do not think he found a mate, for I seldom saw him in the evenings near the same parts of the plantation, and if he had a nest he would of course remain in the vicinity of it at roosting-time. Golden-crested Wrens, I am sorry to say, appear to have been quite cleared out of this locality by last winter's frost, not one appearing during the summer, nor even a visitant during the autumnal migration.

Swallows are partly deserting their old breeding-places here in the cattle-houses and out-offices, for where five pairs used generally to have their nests, only a solitary pair have built for two years past; this season two broods were reared, the second leaving the nest on the 2nd of September.

Of our winter visitants Snow Buntings were pretty numerous; I saw a flock of over forty birds in November, and several smaller flocks throughout the season. Redwings appeared in much smaller numbers than usual, and Fieldfares were very scarce indeed, showing that the summer broods had not recruited

the fearful losses of the previous winter. Blackbirds and Thrushes, even more than the two previously mentioned species, show great mortality in bird life caused by the frosts of 1878-79, for in places where a score of Blackbirds might be seen in ordinary years, now only two or three—or at most half a dozen—birds are now to be met with; and as for Thrushes, two or three are all I have seen throughout the winter, but on the 2nd of this month I heard two birds singing about the place.

Our shore birds appeared in about their usual numbers, with the exception of Lapwings, which were unusually numerous, and more so than in the great Lapwing year of 1877; all through September, October, and up to the middle of November, the immense flocks assembled by day on the sands and along the shores was really wonderful, and by the 5th of November their numbers were so largely increased that when disturbed by the appearance of a Peregrine, or the discharge of a gun, and the flocks, on rising, joining together, they looked more like swarms than flocks of birds. They thus continued until nightly frosts commenced between the 15th and 20th, when they began to diminish in numbers, and by the end of the month very few remained about the sands, these also disappearing with the setting-in of the severe frost the first week of December. A curious fact connected with the habits of the Lapwings in this locality is that very few, if any, come down to the sands and shores of the estuary by day, and while the nights are dark they appear to keep altogether to their inland feeding-grounds, only assembling on the sands and shores by day, while the moon is strong and bright. My friend Captain W. K. Dover, of Keswick, who is a most successful wildfowl shooter, and well acquainted with the habits of our shore birds, assigns as the cause of this peculiar habit of the Lapwings that, during the dark nights, they are unable to obtain a sufficiency of food, and are in consequence obliged to feed during the greater part of the day also, but that during the moonlight nights they obtain such an abundance of food that they do not require any by day, and are thus enabled to come down to the sands in the mornings, and rest undisturbed all day. When on the sands, Lapwings do not stand so close together as Golden Plovers, and though so much more numerous, do not present to the punt-shooter such tempting shots, and in consequence, unless crowded up on a point of sand or shore

by the rising tide, offer no chance of a heavy shot; thirty-four is the largest number I have secured at one shot. This season I was unable to take out my punt before the 29th of October, thus losing six weeks of the best of the Lapwing shooting. However, on that day I had very fair sport, bagging seventy-six Lapwings and one Curlew; but unfortunately, through losing my best chance by a miss-fire, I lost the opportunity of making up my bag to one hundred birds.

On the 4th December, near the Island of Baunros, I got a shot at some Wild Ducks, and picked up four Mallards and a Shoveller Duck; and the following morning, near Roserk Abbey, I saw a little flock of seven or eight Shovellers. Wild Ducks and Widgeon appeared in their usual numbers; but amongst the latter I never remember to have shot so many thin and under-sized birds, many immature females being scarcely larger than Teal, and numbers of immature birds of both sexes appearing stunted and dwarfed, as if hatched very late, and half-starved for want of food when young.

I had some good days' punt-shooting in November and December, my best day's bag being twenty-three Widgeon and four Ducks, of which I got nineteen Widgeon at a shot, and several cripples, escaping into rough water, got away. However, in point of numbers my best day's shooting was on the 22nd January, when I bagged thirty Godwits, twelve Teal, four Oystercatchers, two Ducks, and one Widgeon. The Oystercatchers fell amongst the Godwits, for I should never think of shooting such useless birds except for specimens. A few Scaup Ducks were to be met with in various parts of the estuary throughout the season, and I secured two very fine adult males in splendid plumage.

Wild Swans visited us in large numbers this winter, but were generally observed in small flocks coming from a northerly direction, and all steering right on for Loughs Conn and Cullen. On several days, when out in my punt, I saw flocks of Swans passing from the north, but more pitched in the river or estuary. On one day twenty-seven passed within about one hundred yards of my punt, and so close that I could see the yellow of their bills quite distinctly; and just as they were passing the sun shone out from behind a cloud, causing their snow-white plumage to look almost dazzling. Most of these passing flocks seem to have assembled in one great herd on Lough Cullen. My friend



Captain Kirkwood, of Bartragh, when passing in the train over the railway-bridge at the Lough near Foxpid, on December 17th, saw a herd consisting of between two hundred and two hundred and fifty birds. When first observed, he thought they were the white breakers of the lake; but, as the train passed within about one hundred and fifty yards of them, to his great astonishment, he saw that they were Swans. Another friend of mine, near Ballyshannon, in Donegal Bay, counted seventy Swans in a little inlet of the bay, the week after Christmas; he said they were very noisy when feeding, and observed a large number of grey cygnets amongst the herd.

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#### THE ORIGIN OF VARIETIES IN SALMONIDÆ.

BY FRANCIS DAY, F.L.S., F.Z.S.

THERE is hardly an investigation of more interest to the biologist than the study of how local causes induce temporary, or even permanent, changes in both animals and vegetables, for the purpose of adaptation to new conditions. Among the forms thus subject to constant variation, fishes are no exception, as every fisherman and pisciculturist is aware. These modifications may be due to the quality or quantity of the water in which the finny tribes reside; to the nature of the soil over which the water passes or remains; and many other causes that it will be unnecessary to enumerate in detail. I propose offering a few short observations upon the result of keeping some *Salmonidæ*, from the time of their birth, in a state of unnatural confinement, which has induced changes that might cause a museum-naturalist to believe that the examples before him were either novelties or hybrids between different species. For some there are who consider specific rank ought to be accorded to specimens which do not coincide with the normal types. Thus, a young Salmon with a disproportionately short head and slender body has been termed *Salmo gracilis*. A Trout, owing to its proportions and the extreme muscularity of its stomach, somewhat resembling (it has been considered) the gizzard of a gallinaceous bird, first received the term of "gillaroo," as denoting merely a variety, and a few years since of *Salmo stomachicus*, under the impression that it is a distinct species.

Perhaps there are few families among fishes which can compete with the *Salmonidæ* in so rapidly developing change, and I was greatly interested in receiving the following examples from Mr. Frank Buckland, Mr. Carrington, of the Royal Westminster Aquarium, and other gentlemen who have most kindly sent me specimens, and which I exhibited at the last meeting of the Linnean Society. I wish at this time of the year to draw attention to the following facts, in order that anglers during the ensuing fishing season may be induced to carefully note any remarkable changes in form, scaling, or colours among the fishes they may be so skilful or fortunate as to capture or otherwise observe.

The first example I will allude to is that of an American Trout or Charr (*Salmo fontinalis*) introduced into this country. The specimen is nine inches long, of good condition, and having brilliant colours; it was reared by Mr. Buckland in his tanks at the Horticultural Gardens, at Kensington, from eggs received from Lake Huron. He presented some young to the authorities of the Westminster Aquarium soon after that institution was first opened, and the fish under consideration is the last which survived, having only died in October, 1879, due to having jumped out of its tank. Here there can be no question respecting the parentage of the fish—the eggs came direct from its native habitat, Lake Huron, in America; no crossing with European Trout could have occurred. It is not my purpose to detail the number of scales and fin rays in this place, but I will merely remark that they agree with what obtains in the normal *Salmo fontinalis*. A single glance at the fish, however, is sufficient to show that the head is very much elongated in proportion to the length of its body, and likewise that the very form of the subopercle has changed, being twice as long as deep, instead of square as observed in other examples reared under different conditions. I have likewise two specimens of this fish reared from eggs derived from the same source; they were turned out in Cardiganshire in 1876, and captured in the middle of the succeeding year; their entire length is similar to that of the Aquarium example, but the head is not elongated, the form of the subopercle remains unchanged. It seems to me that these facts are very suggestive; certain unnatural conditions have caused unnatural development of certain parts, and were other examples

similarly reared there exist no reasons why they should not in a like manner differ from the primitive stock. Were such forms transferred to ponds or streams they might retain such abnormal variation through succeeding generations, or return to what normally existed among their progenitors, and thus changes may be induced which ought to be regarded as mere varieties, but most probably would be looked upon as specific were specimens sent to a museum. When a history of the origin of the eggs which produced the original stock is required before any decision can be given as to what the species is, one becomes disposed to question whether species are not being unduly multiplied. It will be exceedingly interesting to watch the *Salmo fontinalis* in this country to ascertain the changes of form which occur, and especially to observe whether it does or does not interbreed with other species, for although I believe that not unfrequently examples of *Salmonidæ* are erroneously considered hybrids, there can be no question but that hybrids may and do occur. But in many instances when two of the at present determined species interbreed, and the result is a so-called hybrid that is not sterile, the possibilities are that the observer has erroneously considered as two species what were in reality merely local varieties of one.

The next fish I will allude to is a young Salmon, which was reared by Mr. Frank Buckland from eggs received from Huningen, and which were collected from Salmon captured for this purpose from below the Falls of Schaffhausen. Examining the specimens (there are four), I cannot see how any doubt can arise respecting their being the young of the true *Salmo salar*. As year after year passed by, and these fish were retained in the small amount of fresh water which was sufficient to fill the tanks in the Horticultural Gardens, the same results developed themselves which have usually attended keeping Salmon-parr in small fresh-water ponds. The body, in short, is that of the *Salmo gracilis* of Couch, and the specimens closely agree with the figures in Dr. Murie's paper, in the 'Proceedings of the Zoological Society' for 1870, upon certain irregularities in the growth of the Salmon.

Passing on to the Gillaroo Trout, the question arises, Is this a variety or a distinct species? Hunter was fully aware of the existence of this fish, and placed specimens of its stomach in his

invaluable museum. He even did more than this—he investigated the reason why these muscular stomachs existed. Having obtained a young sea-gull he gradually brought it to live entirely upon corn. Here the muscular walls of the stomach became thickened, in order to permit the bird, under the changed conditions as to food from what normally occurs, to accommodate its stomach to its new requirements. This organ had to grind up its hard corn, to do which its muscular walls became preternaturally developed. Dr. John Davy remarked that the river Trout, when feeding chiefly on incased larvæ, acquires a stomach of unusual thickness, like the Gillaroo Trout of many of the Irish lakes where they feed chiefly on shellfish. Sir Humphrey Davy, in 1827, writing about the Charr of the Leopoldstein Lake, and those of the Lake of Borguet, observed:—"I am induced to make some observations on the physical causes which by changing the habits in many generations may change the forms of fish. The Trout, when it feeds principally on fish, must be extremely active and strong, consequently from its predatory mobile habits acquires large teeth, large fleshy fins, thick skin, and great pectoral fins for turning. When it feeds on shellfish it gets the stomach of the Charr and its colours, as in the Gillaroo Trout." But if the Gillaroo Trout is a distinct species, it appears by similar reasoning that when other forms of this genus have their stomach thickened, they also should have specific rank accorded. Thompson remarked:—"The coats of the stomachs of other species of *Salmones* than *S. fario* (of which *only* the Gillaroo is set down as a variety) become muscular from the same cause. I have seen *S. ferox* from different localities with a muscular stomach, and these examples were called Gillaroo Trout by persons who distinguish them from the ordinary state of the fish, believing them to be a distinct species." If the Gillaroo is merely a variety, what will be the effect of introducing it into our English streams, as is now proposed? It will simply be that it will revert back to the Common Trout when unable to obtain a supply of shellfish. That crossing or intermingling forms from different places improves the breed of Salmon and Trout was long since pointed out, but whether the Gillaroo is one well adapted for importing may be open to question. A recent author gives as one distinguishing feature its inferior flavour; but this of course may be due to the food it indulges in. In the County



of Derry, in the River Glenlark, in the Munterloney Mountains, we are told by Thompson that the water and stones are deeply tinged with a rust colour, of which the Trout likewise partake. Their flesh is very inferior, and of a metallic flavour—so bad are they that the country people will not eat them.

Lastly, as to colour, we have the *Salmo nigripinnis*, or “Black-finned Trout.” Were this simply considered a new species from its colour some curious questions might arise. Thus, in an excellent article upon “The Brown Trout introduced into Otago,” by Mr. Arthur, in the ‘Transactions of the New Zealand Institute’ for 1878, he observes that in the “Water of Leith,” when first opened for fishing, the Trout were of a fine appearance, colours being bright and the red spots large, but there is a falling off in this respect, at least as regards average-sized fish, and during spawning they all assume a darker or greyish hue. Collecting the results of an examination of various specimens, Mr. Arthur found that the number of rays varied in some of the fins, while the number of black or red spots was by no means constant, and although the best known British authors give the cœcal appendages at from thirty-three to forty-seven, he found them in Otago to be from forty-three to fifty-four, thus opening up another subject respecting Trout upon which I do not at present propose to enter. Still, I may just remark that if the number of these appendages becomes increased owing to change of climate, they must be looked upon with great suspicion as modes of designating species. Many other curious local changes are pointed out as having been induced in the transplanted fish—thus even the shape of the preopercle varies.

In conclusion I must again express a hope that a strict watch will be kept on introduced forms. I have been told that *S. fontinalis*, both in the Wandle and Cardiganshire, has interbred with the Common Trout. A very minute and exhaustive investigation in such cases would be exceedingly interesting, and such I hope will be furnished during the present year.

## OCCASIONAL NOTES.

HABITS OF THE KENTISH PLOVER. — About the middle of April the Kentish Plover arrives in this country; and, as its principal breeding-places are along the south-east and south coasts of Kent, it at once repairs to these spots. Nidification, or rather propagation, begins soon after, depending a good deal on the season. The weather in May, 1878, having been warm, the young were hatched by the end of that month; last season being as much against them as the previous one was in their favour, I found eggs only half incubated by the beginning of June. The eggs, which are three in number, — not four, as is usual with other species of the genus, — are generally laid on the bare beach. Occasionally the bird will deposit them on a heap of seaweed which has been thrown up by a very high tide. The most usual place is on small pebbles through which a little grass grows. Where the eggs are so deposited, it lays its first egg on the stones without any attempt at a nest, but twists a few pieces of the surrounding grass amongst the pebbles, so that by the time the three are deposited there is a scanty apology for a nest. If put off the eggs, the bird will retire to a short distance and utter a plaintive whistle, run a few yards, then fly a little, and drop and run again. As soon, however, as the young are hatched its manner is quite different; it will then fly very close round, giving at each stroke of the wings a sharp whistle, then drop suddenly, as if shot, crouch very close, expand its wings and tail, and drag itself along, then suddenly take wing again, and go through the same motions till the intruder is at a safe distance. The call-note is a soft whistle quickly repeated four or five times. The young, which run as soon as they are hatched, keep close to the parent birds till well able to shift for themselves. The food of this species consists of insects and small worms, which it picks up at the water's edge and on the beach, when its form and manner much resemble the Sanderling, the head being drawn in, the body nearly horizontal, and the thighs concealed among the feathers of the under plumage. There is a species of spider which has hitherto baffled my attempts at capture on account of the rapidity with which it travels among the stones, and which is found in great abundance on the beach, and as the bird is often seen running very nimbly over the stones and occasionally darting its head down it may fairly be presumed that this insect constitutes a good deal of its food. If the eggs are approached, but not too nearly, the bird may be seen to run among the grasses, and every now and then raise itself on its legs and stretch its neck to see and not be seen. It possesses great powers of ventriloquism. I have stood still and tried for some minutes to discover one which was in an entirely different place to what I had supposed from

its note. Their favourite place for exercising this is on a moderate-sized stone, where they will stand and whistle for many minutes at a time. I need not describe either the bird or its eggs, as they have so often been treated of. I would only advise those who wish to see it to visit the collection of the late Dr. Plomley, which is admirably arranged and preserved in the Museum at Dover.—H. A. DOMBRAIN (Westwell Vicarage, Ashford, Kent).

BEWICK'S SWAN IN NORFOLK.—On the 18th February I was marking trees at Hempstead, in Norfolk, where there are some large ponds, one of which is known as the "Old Decoy," which is strictly preserved, and where during the past autumn there has been an average of sixty or seventy Wild Ducks. The Ducks were all gone, as the men felling the trees had driven them away, and only an occasional Mallard comes back to witness the desolation of his quondam abode. I noticed two Swans on the pond, and the keeper remarked that they had been there about four or five days, and had strayed away from a gentleman's place near at hand. I therefore paid no particular attention to them. Indeed they might have escaped notice if they had not attracted our attention by their musical cries, which were so loud as to induce us to leave the trees and go towards them. They had left off swimming, and were standing in the shallow water, and we saw that their beaks were black. The next instant they slowly rose into the air, and the effect of these snow-white birds against the dark background of Scotch firs was very fine. Owing, I suppose, to the difficulty of rising in a confined place, for the pond is surrounded by woods, one of them struck against a Scotch fir and fell to the earth. We ran to get him, but he was not much hurt and made off as hard as he could through the wood—I after him. When within ten yards I saw it was a Bewick's Swan, and a very fine one, too. A regular chase ensued, for the bird had not lost the use of its wings; but I caught it at last, and then discovered that it had struck its head, probably against one of the boughs, and put out an eye. Meanwhile the other Swan flew round, uttering clamorous trumpet-calls. I sent off the keeper for a gun, while the woodman and I spread out the dead bird, and endeavoured, by imitating the calls of its mate, to keep it from flying away. This was successful for about ten minutes, when we had the mortification of seeing it disappear; but a quarter of an hour afterwards I found it on one of the other ponds. As the keeper had some way to go, I had ample leisure to watch it attentively. It certainly did not seem to miss its mate, for it went on feeding busily, its whole head and neck being as often under the water as above. On the same piece of water we keep a pair of Polish Swans, and I had a good opportunity of comparing their carriage with that of the Bewick's Swan. There was very little difference, except that the latter looked no bigger than a goose beside them. Perhaps the Bewick's Swan's neck was a trifle less arched; but in every position it

was quite different from the straight neck of the Whooper. After a long wait the keeper returned with the wished-for guns, and a council of war having been held, he hid up in a sluice at the bottom of the pond while I made a wide *détour*, and with much careful stooping and stalking reached an ambush in the reeds which I had fixed on as my place for a good shot, and the woodman went round to the further side in order to drive the Swan to us. Eventually the pair of Polish Swans drove it towards my ambush, and I shot it. These two birds, though in perfect condition, only weighed nine pounds and three-quarters each, but were in splendid feather—pure white, with a tinge of rufous on the forehead. They measured five feet ten inches from tip to tip of wing, and the base of the bill when fresh was a lemon-yellow, but at a distance the whole appeared black. There was a sexual distinction in the beak, for they proved on dissection to be male and female, which is worth mentioning. In the female the yellow did not extend over the ridge of the upper mandible, which ridge was black, slightly mottled with yellow, the same part in the cock bird being entirely yellow. The gizzard of the latter contained small stones, "silt," pond-grass, water-insects' legs, and the tail of a small fish, while that of his partner appeared to contain only pond-grass. Mr. Gunn tells me that about the same date a Bewick's Swan was shot at Saxmundham, and sent him to be stuffed, and he heard on good authority of two more killed at Yarmouth.—J. H. GURNEY, JUN. (Northrepps, Norwich).

IMMIGRATION OF THE LONG-EARED OWL.—Respecting the immigration of the Long-eared Owl (p. 106), it is perhaps worthy of mention that these birds have during this last winter appeared in very unusual numbers in Sussex. I saw a few days since at Pratt's and Swaysland's, the birdstuffers in Brighton, a considerable number, each of those persons having received above a dozen specimens, of which the first was obtained on the 21th November, 1879, and the last a few days ago (March 4th). Nearly all of these were obtained amongst the furze on the South Downs, attracted, I suppose, by the mice. This bird, though generally diffused about the wooded portions of the county, is by no means abundant, and although it has been mentioned as an autumnal immigrant to the eastern counties, I have never heard till the last few months of so many having been observed in so short a space of time in Sussex.—WILLIAM BORRER (Cowfold, Sussex).

UNUSUAL ABUNDANCE OF THE GREEN WOODPECKER IN SOMERSETSHIRE.—A Taunton birdstuffer assured me that he has had upwards of fifty Green Woodpeckers brought to him for preservation since Christmas! This wholesale destruction of an inoffensive and beautiful bird is much to be regretted. Owing to the scarcity of the migratory Thrushes and most other small birds, the guns of holiday hedge-poppers have had to be levelled



at other game, and the Woodpeckers, unable to screen themselves in the leafless trees, have fallen victims.—MURRAY A. MATHEW (Bishop's Lydeard, Taunton).

[Does not the fact of so large a number of Woodpeckers being found in one district seem to indicate a migratory movement towards the south-west on the part of this species? There is reason to suppose that the Greater Spotted Woodpecker is to a certain extent migratory. (See Yarrell, 3rd ed., vol. ii., p. 155, and Saxby's 'Birds of Shetland,' p. 138). Possibly this is the case also with the Green Woodpecker. The appearance of this bird of late years in Cornwall, where it was formerly unknown (Rodd, Zool. 1876, p. 4796) is very remarkable, and seems to bear upon the question at issue.—ED.]

BREEDING OF THE TUFTED DUCK IN NOTTINGHAMSHIRE.—In the summer of 1878 a nest of the Tufted Duck was mown out not far from the decoy at Park Hall, near Mansfield. The eggs were taken at once to the housekeeper (a clever hand at rearing poultry of all kinds), who hatched them out under a hen, and succeeded in rearing seven, feeding them the same as common ducks, worms also being given them in a tin of water to dive for. In the autumn, when full grown, the ducks left the yard and joined the wild ones of their own species in the decoy, numbers of which frequent the pond, and were lost sight of, the housekeeper being congratulated on her success in rearing such tender birds, and no more was thought about them. However, one day in June last a Tufted Duck was seen by some of the servants at Park Hall to fly over and settle in the yard at the back of the house, and try to get in at the kitchen-door, and also the hen-coops. On the housekeeper being told she went out, and giving the same call she had been in the habit of using when feeding the young ducks the previous year, it immediately ran to her and followed her into the kitchen, and ate out of a saucer and from her hand. This it did for several days, until one morning it appeared followed by eleven young ones, all of which, after being fed, were placed in a coop, but having got so wet by being dragged through the long wet grass—the lake being fully a quarter of a mile from the house—they all died. This is the first instance in which I have heard of the Tufted Duck, of its own free will leaving its wilder brethren and bringing its young to the poultry yard to be fed; but no doubt the bird was influenced by kindly recollections of good treatment the year before.—J. WHITAKER (Rainworth Lodge, near Mansfield).

PEREGRINE FALCON IN HAMPSHIRE.—On November 6th I saw a bird of this species, which I think is worthy of remark. It was shot a day or two previously near the river, where it had been observed for a week or ten days, and is said to have killed a large number of wildfowl during that period. It was a female, and, unlike the condition of many of the

*Falconidæ*, it was very fat when the skin was taken off for preservation. It weighed exactly three pounds two ounces, which to me is an extraordinary weight; and the bulk of its body generally, and especially about the breast, indicated that it had been in good quarters of late, and must have been a most powerful enemy amongst its feathered kin, upon which it throve so well. It measured twenty inches and a half from beak to tail; I did not measure its expanse of wing, but that undoubtedly was in proportion to the length of the bird. Altogether it seemed to me the muscular and stout-limbed creature, especially in the legs and claws, must have been a giantess among her race, and if tamed and well trained would have been the pride of a falconer's heart.—G. B. CORBIN (Ringwood, Hants).

PEREGRINE FALCON AND CURLEW IN OXFORDSHIRE.—On January 17th I purchased a male Peregrine Falcon, which had been shot that morning close to Banbury. As far as I could see, the bird showed no sign of confinement, except that it was very fat—this being very unusual in the generality of the *Falconidæ* killed round here. A Curlew was shot, a few miles off, in the autumn. Fieldfares have been very scarce, but Redwings fairly numerous.—O. V. APLIN (Bodicote, near Banbury).

SUPPOSED BREEDING OF THE SCAUP IN IRELAND.—In October last I received the following from my friend, the Rev. George Robinson, residing near Lough Neagh:—"My sons were out on the lake the other day, and had excellent sport. Among other birds they got a Scaup in immature plumage, without quill-feathers in the wings, and which must have been bred on the lake." Thompson, in his 'Birds of Ireland,' makes the following remark:—"Montagu's remark (in his Supplement) that the Scaup is rarely observed upon fresh-water is applicable to the North of Ireland. It has not been brought to me from Lough Neagh, nor have I known it to be killed on any inland localities, though no doubt such rarely does occur. A small flock, among which were several adult males, was observed in Ballydrain Lake on the 2nd of April, 1848. It is said occasionally to visit Lough Beg, in Kerry, as well as the Pochard. I was told by the chief hawker of wildfowl in Dublin, in December, 1849, that he never received it from inland waters, though nearly all the wildfowl he disposes of are sent thence."—J. GATCOMBE (Durnford Street, Stonehouse).

ON THE NESTING OF THE COMMON WREN.—Peculiar as are many of the situations in which the nest of this species is placed, the birds here last year (May) seem to have struck out a fresh line for themselves altogether—two nests being built in old nests of the Chimney Swallow. One Swallow's nest was in the apex of the roof of an outhouse used as kennels, and the Wren built up the Swallow's nest with *green* moss right to the top, leaving the hole just above the edge of the latter's old nest. This the Wren

plentifully lined with feathers, but no eggs were laid. The other Swallow's nest was in a somewhat similar situation, except that it was in an outhouse with a loft overhead, and consequently when the Wren had built up with moss all the front and sides of the Swallow's nest, the top of its own nest was flat—the one before mentioned being in the form of a sharp peak. This nest had no eggs, and no farther lining than the few feathers left in by the Swallow. It seems strange that the Wrens should have chosen the above situations when there were hay-ricks and beech-hedges in the immediate vicinity.—C. BYGRAVE WHARTON (Hounslow, Hants).

ROOKS IN THE TEMPLE GARDENS.—Since the remarks on the origin of the Temple Rookery were published (Zool. 1878, pp. 196, 443), I have come across a passage in Aubrey's 'Natural History of Wiltshire' (p. 64), which, although very brief, distinctly indicates that the Rookery in question is of much older date than is to be inferred from the work previously quoted. Aubrey's words are:—"Tis certain that the rookes of the Inner Temple did not build their nests in the garden to breed in the spring before the plague, 1665; but in the spring following they did." What, then, becomes of the pretty story of their having been introduced by Sir William Northey in the reign of Queen Anne?—J. E. HARTING.

STOCK DOVES BREEDING IN MAGPIES' NESTS.—It is not, I believe, generally known that, in addition to the many curious sites fixed on by the Stock Dove for nesting, it will occasionally resort to a deserted nest of the Magpie. I am able to enumerate at least four distinct instances of this, two of which have come under my own observation. The first I have already recorded in 'The Zoologist' (1876, p. 4875), but "Wood Pigeon" was by some mistake printed for "Stock Dove," and the second occurred last August, when I shot the Stock Dove as it flew out of the nest, so there can be no doubt as to the species. For the other two instances I am indebted to an oologist in Warwickshire, who discovered their nests when in search of eggs for his collection.—C. MATTHEW PRIOR (The Avenue, Bedford).

GREAT SKUA AT BRIGHTON.—In the middle of February last I saw a Great Skua flying over the sea near the Chain Pier at Brighton. It looked very black on the wing and flew heavily, as if fatigued. A few days afterwards one was shot near Brighton, and taken to Swaysland for preservation. This bird was unusually dark in colour, and, as this species has not been very often obtained on the Sussex coast, was probably the one that I saw.—W. BORRER (Cowfold, Sussex).

ROUGH-LEGGED BUZZARDS IN WILTSHIRE.—A Rough-legged Buzzard was killed at Ferne, near Salisbury, on January 1st; and a fortnight previously one at Avon Castle, about four miles from here.—EDWARD HART (Christchurch, Hants).

**MANX SHEARWATER INLAND.**—Early in September last, as some miners were proceeding to work one morning at Lofthouse, near Wakefield, they observed a bird endeavouring to flutter over a wall into an adjoining plantation. They easily captured it, and kept it alive for some days, when it was killed and sent to me for identification and preservation. I at first took it to be the rarer Dusky Petrel; but your opinion, as you have seen the bird, induces me to change my view. As it was found at so great a distance from the sea, the circumstance, as above narrated, may be worth recording.—J. SPURLING (42, Northgate, Wakefield).

**SINGULAR DEATH OF A BLUE TITMOUSE.**—A curious circumstance came under my notice the other day. While walking along a hedgeside in my meadow, I observed a Blue Tit dangling from a twig; it had got its head through a noose of hair which was entangled in the bushes, and had fluttered about till it had twisted the hair quite tight. I saw it some considerable distance off struggling to get free, but by the time I got to the place it was very nearly dead, and expired shortly afterwards.—J. KING (Langford Road, Biggleswade).

**GREY SHRIKE, RAVEN, AND GOOSANDER IN THE WEST OF ENGLAND.**—It may interest some of your readers to note the occurrence in the West of England of the following birds, which have been sent to me for preservation:—A Great Grey Shrike, obtained near Malvern; an adult male Raven, shot near Winchcombe, Gloucestershire; and an adult male Goosander, killed at Hinton Blewitt, near Bristol.—H. WHITE (The Museum, Cheltenham).

**CHIFFCHAFF REMAINING IN ENGLAND DURING THE WINTER.**—A Chiffchaff was shot at Barton Grange, near Taunton, about the commencement of the present year, and was in very good condition. Strange that it should have remained here throughout such an unusually severe winter.—MURRAY A. MATHEW (Bishop's Lydeard, Taunton).

**THE BIRDS OF YORKSHIRE.**—In the 'Transactions of the Yorkshire Naturalists' Union,' Mr. W. Eagle Clarke, of Leeds, has commenced a Catalogue of the Birds of Yorkshire, in which full details are given concerning the occurrence of the rarer species. Should any of our readers be able to furnish Mr. Clarke with information likely to be useful to him, we make no doubt he will be pleased to receive and acknowledge it. His address is 5, East View, Hyde Park, Leeds.

**GREAT BUSTARD IN ESSEX: CORRECTION OF AN ERROR.**—In 'The Zoologist' for January last (p. 26) Mr. Smoothy reports a Great Bustard shot by Mr. A. Pertwee at Woodham Ferrers, near Hull Bridge, on the 5th December last. In a succeeding number (p. 110) Mr. Travis refers to a Great Bustard "procured by Mr. Porter near Chelmsford" also on



December 5th. From these two statements it might be inferred that two Great Bustards had been recently obtained in Essex. It appears, however, from the report of a paper read by Mr. R. M. Christy, of Chignal, near Chelmsford, at the first meeting of the recently-formed Essex Naturalists' Field Club, that this is not the case. Both the communications above mentioned refer to one and the same bird, which was shot on December 5th by Mr. Albert Pertwee, of Woodham Ferrers, at Hull Bridge, which is some ten or twelve miles from Chelmsford.—J. E. HARTING.

ERRATUM.—Tain is not in Sutherlandshire (p. 111, line 27); it is the county town of Ross-shire.

BANKS' OAR-FISH NEAR WHITBY.—Mr. C. W. Elliott, in 'The Field' of the 7th February last, announced the capture, at Staithes, near Whitby, of a singular fish, which was at first supposed to be the Vaagmaer, or Deal-fish, *Trachipterus arcticus*, but which, from the description given, is doubtless Banks' Oar-fish, *Regalicus Banksii*. Mr. E. W. Holdsworth, writing in a subsequent number of 'The Field,' remarks:—"The characters given of the specimen by Mr. Elliott all agree with those of the Oar-fish, and its dimensions, with their peculiar proportions, are found in no other species met with on our coast. Dr. Günther, in his 'Catalogue of Fishes,' refers to fourteen examples of this species, or which appear to belong to it; for the record of captures, extending from 1759 to 1852, is in many cases very imperfect in details of specific character, in which the length ranges from eight to eighteen feet. One specimen, said to have been caught in 1845, is stated to have been twenty-four feet long; but there is some reasonable doubt about the accuracy of the statement. Perfect specimens are rarely obtained, and restorations of form and length are generally open to question. The most complete and trustworthy description of the species was given by Hancock, in the 'Annals and Magazine of Natural History' (1849, iv., p. 1), from a specimen obtained on the Northumberland coast, and is reproduced in the third edition of Yarrell's 'British Fishes,' the figure and description of this fish in the first edition of that work being very imperfect, owing to the scanty materials then within reach. Among the peculiarities of this Oar-fish may be mentioned the curious prolongation of the first twelve spines or rays of the dorsal fin, extending to a length of more than twelve inches in the anterior six or seven, and diminishing in length as they proceed backwards. It appears that these rays are very liable to be broken off; but it would be interesting to know whether Mr. Elliott observed anything like them. The ventral fins, described by him as two bone-like protuberances, have here the character so often noticed; but really they are only the remains of two long spines, said by

some persons to be bifurcate in their perfect condition. This is a point that wants clearing up. The tail is also somewhat peculiar, being obliquely truncate, and without any distinct terminal fin. The specimen which came under the notice of Mr. Hancock, and was described by him and Dr. Embleton, was also examined by Yarrell and Couch whilst it was being exhibited in London, and the latter author prepared from it his figure of the species, which was afterwards published in the second volume of his work on 'British Fishes.' The illustration of the Oar-fish in the third edition of Yarrell's work was also made from this specimen. Nothing appears to be known of the habits of this curious fish; but, from the rarity of its capture, it is probably a deep-water species. It has not been hitherto found except on the British coast, four specimens having been obtained in Cornwall, and the others on the eastern side of England and Scotland. Couch mentions that three or four specimens had been captured since the one he examined in 1849, and the largest of them, taken near Wick, measured fifteen feet and a half in length. Five other species of the genus are included in Dr. Günther's Catalogue as found in the seas of Europe, the Atlantic, Indian and New Zealand seas. There is a good deal, however, yet to be learned about them all, and there is only an imperfect specimen of one species in the British Museum." The first example on record in England is said to have been obtained at Whitby in January, 1759. It is curious that the latest which has occurred, viz., that now under notice, should have been procured in the same locality.—J. E. HARTING.

THE HOUTING ON THE SUSSEX COAST.—During the present month of March an example of this fish, *Coregonus oxyrhynchus*, was sent by Mr. Byerley, of Chichester, to Mr. Buckland, who kindly handed it over to me. As it was perfectly fresh, it may be accepted without doubt as a local capture from off the Sussex coast. The first British specimen of this fish was recorded by me in the 'Proceedings of the Zoological Society' for May 15th, 1877; two examples were received from Lincolnshire as "Grayling." I suspect this is the fish recorded by Rutty, in his 'Natural History of the County of Dublin' (1772), wherein he observes:—"Thymallus. The Grayling or UMBER. With us it is a sea-fish, and less than Willughby's, which is a river fish." The Houting is found along the coasts of Holland, Germany, and Denmark, entering rivers; therefore stragglers to Great Britain probably are not rare. The true Grayling is not an Irish fish, consequently Rutty must have been in error as to his species, while a *Coregonus* such as the Houting may have been mistaken for a *Thymallus*.—FRANCIS DAY (Kenilworth House, Pittville, Cheltenham).

TROUT IN THE THAMES.—On the 12th February last two Trout were taken in the Thames between Hungerford and Waterloo Bridges, the

larger weighing  $14\frac{1}{2}$  oz. and measuring  $13\frac{1}{4}$  inches, and the smaller weighing  $5\frac{1}{4}$  oz. and measuring  $9\frac{1}{4}$  inches. Mr. Buckland, who examined them, reports that they were young Bull Trout. The stomach and throat of the largest of these fish was as full as it could be of Whitebait, upon which it had been feeding. It was fat to an extraordinary degree, the pylories being so covered with fat that it was with difficulty they could be counted. Both fish were silvery, with fins a faint yellow, tail square, and on its edge a darker line; the adipose fin tipped with red: the body covered with spots, descending a long way below the lateral line. In life these spots must have been of a dark brown colour. Mr. Buckland was puzzled to know whence these fish could have come, but believed them to be truly wild, and not artificially bred. For some years past he has been in the habit of receiving specimens of this kind of Trout from the mouth of the Thames about the time that the Whitebait make their appearance, and he has no doubt that they follow the shoals to feed upon these small fry. The man who caught them was fishing for Flounders, and it is satisfactory to think that the water is now sufficiently purified to enable not only Flounders but Salmonoids to live in it. A considerable portion of the London sewage being now taken down into the estuary by the main-drainage works, the mid-portion of the river is said to be comparatively clear.—J. E. HARTING.

GREENLAND BULLHEAD AT BRIGHTON AND SOUTHEND.—According to Couch, this species, *Cottus grænlandicus*, has only once been recorded from any part of the British seas, and then from the coast of Kerry. During the past month I have received three living specimens, about six inches in length, captured between Shoreham and Brighton; and several other specimens arrived last night (March 16th) of about the same size, taken in the Whitebait nets off Southend, in the estuary of the Thames. The remarkable part of this occurrence is that I have from time to time during the last four years received large numbers of other species of the genus *Cottus* which inhabit our coasts, but never before saw examples of the Greenland Bullhead. I forwarded three examples to my friend Mr. Francis Day, who has compared them with Greenland specimens from the Leyden Museum, and thus kindly confirmed my identification. Yarrell, in his 'Natural History of the Fishes of Britain,' makes no mention of this species, but in the Supplement reference is made to the Kerry specimens, and the species is there well figured. Dr. Günther, in his Museum Catalogue, simply gives Arctic seas of America as the habitat, but I believe it is also taken in the extreme north and west of Europe. The Greenland Bullhead grows, I understand, to a large size in the waters east of Greenland, and is there esteemed as an article of food. This species might easily, in its younger stages, be passed amongst a batch of Bullheads (*Cottus scorpius*) or Father-lashers (*Cottus bubalis*), being superficially like the latter. A second look,

however, will at once separate them, there being below the lateral line some beautiful white spots, edged with rich carmine and brown. In some specimens these spots are white only, and without the rich colouring, but this difference may be sexual.—JOHN T. CARRINGTON (Royal Aquarium, Westminster).

GREENLAND BULLHEAD AT BRIGHTON.—Mr. Carrington has recently been good enough to send me three examples of this fish captured during the month of February this year at Brighton, two being five inches and one six inches and a half in length. Couch observes that "no more than two instances are known of its having been taken in the British Islands, and both of these occurred in Ireland." It is a fish which was long confounded with the common Father-lasher. Having received two Greenland examples from the Leyden Museum, I have been able to compare them carefully with the Brighton specimens, and, without entering into details, I may observe that they agree in every essential respect, and those examples which are marked with large round white spots are said to be males. All the three examples alluded to had these round white spots, and all were males. It is, however, worth recording that such large and brilliantly-coloured examples have been taken so far south as Brighton.—FRANCIS DAY.

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DEATH OF MR. BELL, OF SELBORNE.—To every reader of 'The Zoologist' the name of Thomas Bell must be a "household word"; for who has not, many a time and oft, had occasion to consult the pages of 'British Quadrupeds' and 'British Reptiles,' or turn to the volume on 'Stalk-eyed Crustacea' in order to identify some doubtful species picked up in the course of a sea-side ramble? Who, again, has not read with pleasure the latest edition of 'The Natural History of Selborne,' enriched as it is with the critical notes of him who has just passed peacefully away in the very house in which Gilbert White lived and died? The announcement of Mr. Bell's death will, we feel sure, evoke amongst naturalists a universal expression of regret; for even those who did not know him personally will acknowledge a feeling of indebtedness to one who, through his published works, has been the means of imparting so much valuable knowledge in different branches of Zoology.

Mr. Bell died at Selborne on the 13th March, at the advanced age of eighty-seven. Since the year 1860 he cannot be said to have taken any active part in the proceedings of the scientific world, for his reputation will rest upon the excellent work which he accomplished prior to that date. Nevertheless in his retirement at Selborne he was by no means idle, for he occupied himself in the preparation of a second edition of his 'British



Quadrupeds,' which appeared in 1874, and in collecting materials for a new edition of Gilbert White's works, to which we have already referred, and which was published in two volumes in 1877. In his leisure moments, too, he found time to contribute occasionally to the pages of 'The Zoologist' the result of his out-door observations on various topics of interest to naturalists, which will be fresh in the recollection of our readers.

The position which Mr. Bell occupied in the scientific world as former Secretary of the Royal Society, President of the Linnean Society, and Professor of Zoology at King's College, London, furnishes an example of the eminence which may be attained by a zealous worker in the cause of Zoology, having always at heart the interests of others rather than his own, and the advancement of a science of which he proved so able an exponent. Few amongst his disciples have greater cause to be grateful for his encouragement and assistance than the Editor of this Journal, who will ever look back with mingled feelings of pleasure and regret to bright days passed at Selborne in the society of his kind-hearted mentor and friend.

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## PROCEEDINGS OF SCIENTIFIC SOCIETIES.

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### LINNEAN SOCIETY OF LONDON.

February 19, 1880.—WILLIAM CARRUTHERS, F.R.S., Vice-President, in the chair.

Mr. Edwin Simpson Baikie was elected a Fellow of the Society.

Mr. James Britten exhibited some specimens of Ants, a species allied to, if not identical with, *Pheidole javana*, Mayr. These insects, it seems, bore tunnels and galleries ramifying through the under-ground stems of plants of the genus *Myrmecodia*, which grow in the Eastern Archipelago. The Italian savant, Beccari, who has studied the living *Myrmecodia* in its native localities, asserts that the presence of the ants is essential to the plant's existence: for unless the young plants are attacked by the ants they soon perish. As illustrating this, Mr. Britten brought forward a series of examples of young and old *Myrmecodia celimata* and *M. glabra*, which had recently been sent home from Borneo by Mr. H. O. Forbes, and certainly all of these manifested the ant's industry. This curious abode, when seen in longitudinal section of the swollen underground stem, resembles in some respects the chambered tunnels of the White Ant, *Termites*.

A different example, but equally curious, was that brought forward by Dr. Maxwell Masters, viz., a pitcher-plant (*Nepenthes bicalcarata*), from Borneo. It seems these peculiar pitchers, when in the growing condition in the forest, are perfect traps to creeping insects, in consequence

of the incurved spinous ridges round the throat of the pitcher. To take advantage of the store, a certain species of black ant ingeniously perforates the stalk, and making a passage upwards provides safe inroad and exit to get at the sumptuous fare of dead and decaying insects contained within the pitcher. Moreover, the remarkable Lemuroid (*Tarsius spectrum*) likewise visits the pitcher-plant for the sake of the entrapped insects. These it can easily obtain from the *Nepenthes Rafflesiana*, but not so from the above-mentioned *N. bicalcarata*, where the sharp spurs severely prick the animal if it dares to peep in or trifle with the armed umbel.—J. MURIE.

#### ZOOLOGICAL SOCIETY OF LONDON.

February 17, 1880.—ARTHUR GROTE, Esq., Vice-President, in the chair.

The Secretary read a report on the additions that had been made to the Society's Menagerie during the month of January, and called special attention to a Japanese Hawk-eagle (*Spizaetus orientalis*), from Japan, presented by Mr. Harry Pryer, of Yokohama; and to two Blue-eyed Cockatoos (*Cacatua ophthalmica*), presented by the Rev. George Brown, of Duke of York Island.

Mr. Sclater exhibited and made remarks on a skin of *Colobus palliatus*, Peters, from the Zanzibar coast, and pointed out its apparent identity with his *Colobus angolensis*.

A letter was read from Mr. W. B. Pryer, of Elopura, Bay of Sandakan, Northern Borneo, relating to certain birds and quadrupeds of that country.

Prof. Flower exhibited and made remarks on the skull of a two-horned Rhinoceros (*Rhinoceros sumatrensis*), which had been obtained in Sandakan, Northern Borneo, by Mr. W. B. Pryer.

Mr. Sclater exhibited and made remarks on the drawing of an apparently new Parrot of the genus *Chrysotis*, now living in the Society's Gardens, which he proposed to call *Chrysotis caligena*, after Mr. Lawrence's MS.

Prof. Flower read a paper on the anatomy of the Bush-dog (*Icticyon venaticus*), based on a specimen lately living in the Society's Gardens.

Mr. W. A. Forbes read a paper on some points in the structure of *Nasiterna*, bearing on its affinities.

A communication was read from Mr. Geoffrey Nevill, containing a paper on the land-shells, extinct and living, of the neighbourhood of Mentone (Alpes Maritimes), with descriptions of a new genus and of several new species.

Mr. W. Tegetmeier read a note on the synonymy of the Kaffir Crane, commonly called *Balearica regulorum* (Licht.).

Lord Walsingham read a paper on some new or little-known species of *Tineidae* from North America.

March 2, 1880.—Professor ST. GEORGE MIVART, Esq., F.R.S., Vice-President, in the chair.

Mr. W. A. Forbes read the first of a series of papers on the anatomy of Passerine Birds. The present communication related to the structure of the stomach in the genus *Euphonia*, and in other allied genera of the family *Tanagridæ*.

Mr. A. G. Butler read a paper on some new and little-known species of butterflies collected in India by Dr. Watt, of the Calcutta University.

Messrs. Sclater and Salvin read a paper on the birds collected by Mr. Clarence Buckley in Eastern Ecuador. During his recent residence at Sarayacu, on the Upper Rio Pastaza, Mr. Buckley had formed a very large collection of birds, which had been carefully examined by the authors, and of which they hoped to be able to give a general account on a future occasion. On the present occasion they described only the eighteen species which they considered to be new to science.

Mr. Howard Saunders read a paper containing a descriptive list of the Sea-birds obtained by Lord Lindsay during his voyage in the yacht 'Venus' to Mauritius. The species were eighteen in number, and mainly belonged to the families *Fregatidæ*, *Pelecanidæ*, *Phaetontidæ*, *Laridæ*, and *Procellariidæ*.

Mr. M. Jacoby communicated a paper containing descriptions of new species of Phytophagous Coleoptera collected in South America.

Mr. A. G. Butler read a paper on some new species of Orthoptera of the genus *Anostostoma*, collected by Mr. Kingdon at Antananarivo, Madagascar.

A communication was read from Col. R. H. Beddome, containing the description of a new species of snake, obtained in Malabar, proposed to be called *Plectrurus aureus*.

Messrs. Godman and Distant read a paper containing the descriptions of five new species of African butterflies.—P. L. SCLATER, *Secretary*.

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#### EPPING FOREST AND COUNTY OF ESSEX NATURALISTS' FIELD CLUB.

The first ordinary meeting of this Society was held at Buckhurst Hill, Essex, on February 28th, the President, Mr. Raphael Meldola, F.R.A.S., F.C.S., presiding. Nearly seventy members were present.

The minutes of the foundation meeting having been read and confirmed, the President delivered an inaugural address on the objects and work of the Club. In the course of his remarks he observed that in forming the Epping Forest Club their primary object was the furtherance of science—the annual addition of something, however humble, to the general stock of human knowledge. They already included in their ranks many members well versed in special branches of Natural History, to whom they should look for

assistance in their respective subjects; and he was glad also to be able to announce that many eminent specialists outside their own Society had promised their valuable aid in identifying specimens or in other ways promoting the object of the Club. Their chief objects, the advancement of natural science, would be best effected by the publication of original papers, notes, and discussions; but they must likewise bear in mind that science would also be indirectly promoted by mutual intercourse and instruction, and, above all, by fostering and educating the scientific faculty in their younger members. In the course of time, as their Society continued to increase,—as it surely would if it only fulfilled the promises of its early youth,—they should hope to establish permanent collections in a museum, and any contributions of specimens to form the nucleus of such a public collection would at any time be welcome. He would suggest that a "Museum Fund" be started for that purpose. He pointed out the obvious advantages of having in one building their collections, library and meeting room, and suggested that it would be best for the members to endeavour to furnish the museum, as far as possible, from specimens collected by themselves in the county. He hoped that by having specimens illustrating the life-histories of the species and their structure and anatomy, in time they might possess a collection of educational and technical value that would not be unworthy of a Field Club which already included members of many of the most influential families in the county, and which might ultimately become of scientific use to specialists outside their own ranks. Mr. Meldola then gave a sketch of the geological features of the county, and the influence of the glacial epoch on the conformation of Britain. He thought that a large field of labour lay before their geological members in attempting to determine the relative ages of the various drift-deposits of their own district, and thus contributing their mite towards erecting the structure of that noble science which regarded "ages as its days." A vote of thanks was accorded to the President for his "address," coupled with a resolution to print it for the members.

The Secretary read a paper communicated by Mr. R. M. Christy, of Chignal, near Chelmsford, "On the Occurrence of the Great Bustard (*Otis tarda*, Linn.) and the Rough-legged Buzzard (*Buteo lagopus*) near Chelmsford, during the Winter of 1879." The specimen of the Great Bustard was shot by Mr. Albert Pertwee, of Woodham Ferrers, soon after daybreak on December 5th, at Hull Bridge, in that parish. The author described the specimen, which is a young male, and weighed ten pounds. Its total length was about three feet nine inches, and the expanse of wing exceeded seven feet. He also gave some interesting particulars as to the former history of this extinct bird—that is, extinct in the British Isles. So far as he knew there was no definite and authentic record of the occurrence of the Great Bustard in Essex; but Mr. Smooty recollects being told many



years ago by a very aged farm labourer that he had once known of a nest near Chelmsford; and there is a hamlet called Bustard Green, not far from Dunmow. Yarrell, too, mentions an advertisement in the 'Spectator' for 1712, where an estate was to be let at Heydon, near Saffron Walden, with "woods of large timber where is all game, even to the Pheasant and Bustard." He considered that in all probability the Bustard had not been a very rare bird in Essex; but he did not think that it had ever been abundant, for the county has not—nor has it had for a very long time past—those large open and uncultivated tracts which form the strongholds of the species. The Essex specimen (exhibited at the meeting) was purchased by Mr. C. Smoothy, of Bexfields, Galleywood, near Chelmsford, in whose collection it is now preserved. The Rough-legged Bazzard was shot by Mr. David Christy, at Patching Hall, near Chelmsford, on December 19th, 1879. It was a female, in very good condition.

Mr. E. A. Fitch said that he had heard of two other specimens of the Great Bustard in Essex this winter—one at Manningtree and one at Maldon. He also observed that the local papers had reported the specimen described by Mr. Christy as occurring at Chelmsford. This was incorrect, as Hull Bridge was ten or twelve miles from that town.

Mr. N. F. Robarts exhibited a molar tooth of *Elephas primigenius* from brick-earth at Lea Valley, Upper Clapton, and specimens of granites and lavas used for road-mending by the Woodford Local Board.

Mr. James English exhibited various species of Fungi and Lichens from Epping Forest, with the natural forms wonderfully preserved, and many rare species of Lepidoptera taken in the forest during the last thirty or forty years.

Mr. Gould exhibited drawings showing the differences between the Viper and the common Ringed Snake.

Various living organisms under microscopes were exhibited by Messrs. F. Oxley, W. Forster, R. Letchford, and H. Crouch.

#### NOTICES OF NEW BOOKS.

*The Crayfish; an Introduction to the Study of Zoology.* By T. H. HUXLEY, F.R.S. 8vo. London: Kegan Paul & Co. 1880.

IN this, the latest addition to Messrs. Kegan Paul's "International Scientific Series," Prof. Huxley has set himself the accomplishment of no easy task—*viz.*, to show, as we learn from his preface, "how the careful study of one of the commonest and

most insignificant of animals leads us, step by step, from everyday knowledge to the widest generalizations and the most difficult problems of Zoology, and indeed of biological science in general." The work, then, although entitled 'An Introduction to the Study of Zoology,' is to be regarded not so much as a graphic and popularly written exposition of the leading outlines of biological science, as a hand-book for those who are desirous, "crayfish in hand," of gaining for themselves a practical acquaintance with the subject from personal observation and experiment.

After some preliminary remarks on the relation of "common knowledge" to science, and a discussion of the derivation of the term "crayfish," Professor Huxley, in his introductory chapter, sets before the reader such points in the structure, growth and development of the animal as may be gathered by anyone possessed of ordinary powers of observation, and without having recourse to special appliances and means of investigation.

In the two following chapters the physiology of the Crayfish—in other words, the working of the mechanism of its digestive, respiratory and circulatory organs, of its muscular and nervous systems, and the various organs of sense and reproduction—is described; and here, as in the succeeding chapters devoted to the consideration of the Crayfish from a purely morphological point of view, a multitude of details which to the unscientific reader might have become, under less able treatment, wearisome and perplexing, are rendered interesting by the author's graphic style and skilful use of illustration, relieved by occasional digression on such topics as the nature of the Crayfish-mind,—that is to say, the question of its possession of consciousness is discussed, and the extent to which its sensations of light and darkness, form and colour, are comparable to those of animals higher in the scale of organization and possessed of more highly specialized organs of sense.

Proceeding next to the consideration of the morphology, or structure of the various parts and tissues, of the individual Crayfish, the composition of the exoskeleton and of the several body-rings or "somites" of which it is made up, and of their respective appendages is described, and it is shown how all are constructed on the same fundamental plan; the nature of the epithelium and of the connective muscular and nervous tissues is explained; finally, the development of the embryo from the

earliest division of the yolk to the period when it leaves the egg is briefly sketched out.

In his next chapter, Prof. Huxley treats of the *comparative* morphology of the Crayfish—in other words, its structure and development are compared with those of other living creatures. After a long description of the common English species of Crayfish, the terms “species,” “genus” and “family,” used by naturalists to denote the various groupings of animals possessing a common plan of structure, are explained, and it is shown how all the different kinds of Crayfishes may be regarded as modifications of a common Astacine plan; that in a similar way all the *Arthropoda* are connected by closer or more remote degrees of affinity with the Crayfishes, and that ultimately all living forms may be regarded as related to one another as being either cells or composed of aggregates of cells.

The author's classification of the Crayfishes by the peculiarities of their gill-structure is almost entirely original, although Erichson and Dr. Hagen had previously separated the Eastern and Western American species by a difference in the number of their branchiæ. The results of Prof. Huxley's researches have already been brought before the scientific world in his paper on the classification and distribution of the Crayfishes, published in the ‘Proceedings of the Zoological Society’ for last year; but they are exposed in a more popular manner in the present work, and characters of so much value to the student of the evolutionary history of the existing species have been discovered that we doubt not, when new workers have been attracted to the subject and the study has been pursued more into detail, important modifications of the systematic arrangement of the larger groups will result therefrom. In the *Astacina*, at least, good characters have been discovered for the definition of forms widely separated in geographical position, but hardly to be separated as species—certainly not as genera—by external characters.

The distribution of the Crayfishes over the surface of the globe, and the correspondence of their structural differences with the peculiarities of their geographical range is considered in the final chapter; each species, genus and family has its peculiar distribution, and that of the group as a whole is compared with the analogous distribution of the fresh-water *Salmonidæ*. All the Crayfishes of the Northern Hemisphere are shown to belong to

one family (the *Potamobiidæ*), and those of the Southern Hemisphere to another (the *Parastacidæ*), the two groups being separated by the wide equatorial belt of the earth's surface.

Perhaps the most interesting portion of the work to the student as to the non-scientific reader is that comprised in the latter part of this chapter, wherein Prof. Huxley attempts to show how the theory of evolution, and that alone, can adequately explain the known facts relating to the morphology and distribution of the Crayfishes. The manner in which they may have gradually spread themselves over the surface of the globe is traced out, and it is shown how facts which at first sight would seem to militate against the theory of development may be satisfactorily explained; how, for example, the existence of the same kind of Crayfish in the rivers of England and France, and the similarity of the Crayfishes of the Amurland and Japan, may alike be due to the subsidence of land that in former geological periods may have united what are two islands with the continents of Europe and Asia; while, on the other hand, the absence or scarcity\* of Crayfishes in the area occupied by the fluviatile Crabs (*Telphusidæ*) may be due to the fact that the latter, being the stronger race, have either driven their rivals from the field, or successfully prevented them from entering rivers of which they were the earliest tenants. Not the least instructive section of this chapter is that devoted to the genealogy of the Crayfishes, so far as it can be made out from a comparative study of the fossil remains occurring in the various geological epochs.

The general excellence of the woodcuts with which this work is illustrated, and the very complete bibliographical Index, will greatly assist the student who is desirous of pursuing the study of the Crayfishes further into detail. We may remark, however, that Prof. Huxley appears to have overlooked a somewhat important paper by Von Martens on the classification of the Australian *Astacidae*,† for he figures without certainly identifying the large and spiny species, which, described by Heller as *A. spinifer* and by Von Martens himself as *A. arcuatus*, is rightly identified by

\* Prof. Huxley does not say *total absence*. In Japan, for example, to cite an extra-European instance, *Telphusa Dehaani* competes with *Astacus japonicus* for the possession of the rivers, and in Australia *Cheraps quadricarinatus* has been recorded by Von Martens from Cape York, together with *Telphusa transversa*.

† Monatsber. der Akad. Wissensch. Berlin, 1868, p. 615.



the latter author (who follows White) with the long-previously-described *Cancer serratus* of Shaw.

*À propos* of the subject of systematic nomenclature, we may observe that Prof. Huxley identifies all the specimens of British Crayfishes that have passed through his hands with the species or variety designated *torrentium* by Schrank; as, however, it must be difficult, if not impossible, to determine to which of the modern species Fabricius applied the name of *fluviatilis*, we trust it may yet be found possible to preserve for the common Crayfish of Great Britain the name which has so long been applied to it in our systematic works—the designation, namely, of *Astacus fluviatilis*.

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*The Fauna of Scotland: with special reference to Clydesdale and the Western District.*—Mammalia. By EDWARD R. ALSTON, F.L.S., F.G.S. 8vo, pp. 39. Glasgow: published by the Natural History Society of Glasgow. 1880.

In this recently published catalogue by Mr. Alston we have a section of a comprehensive work on the Fauna of Scotland, projected by the Natural History Society of Glasgow, the preparation of which has been entrusted to different naturalists, each of whom has taken up some special group. Mr. Alston does not enter into any details of description or economy, which may be found elsewhere, but confines his remarks strictly to the department of geographical distribution, endeavouring at the same time to reconcile the spirit and the letter of the British Association rules for nomenclature, by selecting the first clearly defined name for each species, while avoiding all unnecessary changes of well known and generally accepted names. As a result, Mr. Alston has produced a catalogue of practical utility and value, his tables of the comparative distribution of British Mammals in England, Scotland, and Ireland being especially interesting. As regards their distribution in Scotland there is still a good deal to be learnt, particularly in the islands; but Mr. Alston has made the most of the materials at his command, and has smoothed the path for future investigators by pointing out what is already known on the subject, and indicating in what respects further information is desirable.

*A Guide to the Botany, Ornithology, and Geology of Shrewsbury and its Vicinity.* The Botany by W. PHILLIPS, F.L.S.; the Ornithology by W. E. BECKWITH; the Geology by C. CALLAWAY, M.A., F.G.S. 12mo, pp. 65. Shrewsbury: Bunny and Davis.

THE first twenty-six pages of this little work are occupied with a list of the Flowering Plants and Ferns found within a radius of five miles round Shrewsbury. In the preparation of this list the author acknowledges his indebtedness to a larger work, 'The Flora of Shrewsbury,' by the Rev. W. A. Leighton, and states that for several years past he has made it his business to verify the records of plants mentioned in that book, which he has found to be very correct. As might naturally be expected he has been able to add several new localities for some of the plants, and has had to point out a few instances in which agricultural improvements have destroyed old habitats. In the present list, with a view to economise space, all common species are merely named, while the rarer species have the localities appended.

Mr. Beckwith's List of Birds, which follows, occupies about eight pages, and includes only those which have been observed within five or six miles of Shrewsbury—in all 165 out of 218 found in the county of Salop. Amongst the rarer birds, Mr. Beckwith includes the Red-footed Falcon, Lapland Bunting, Richard's Pipit, Rose-coloured Pastor, Glossy Ibis, and Sabine's Gull. He remarks that the Nightingale "has been heard near Meole and in other places within the last few years"; that the Red-legged Partridge has once been killed near Charlton Hill in 1878; and that the Pochard and Tufted Duck, having been observed on Almond and Bomere Pools in the third week of April, possibly breed in the neighbourhood. There is a heronry consisting of thirty or forty nests at Attingham, where they are strictly preserved by Lord Berwick.

The remaining pages are devoted to a sketch of the Geology of Shropshire, in which the author, Mr. Callaway, endeavours to remove some of the misconception which has prevailed in regard to the "Pre-Cumbrian Volcanic Series," and notices the chief elevations in detail. At page 50 he gives a list of Cumbrian Fossils of Shropshire, most of which are comparatively new to

science, and have been described by the author in the 'Quarterly Journal of the Geological Society' (vol. xxxiii., pp. 663-670).

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*Tunstall's 'Ornithologia Britannica': a Catalogue of British Land and Water Birds.* Printed for the Author, in folio. London, 1771.

THIS is a reprint of a scarce ornithological tract of four pages, executed by photo-lithography, and for convenience reduced in size from the original folio to demy octavo. It is issued by "The Willughby Society," which was formed a year ago with the object of reprinting certain ornithological works interesting for their utility or rarity, and is the first of the series undertaken.

In a Preface by the Editor, Professor Newton, a few particulars are given concerning the author, Marmaduke Tunstall, the reader being reminded that a memoir of him is given by Fox in his 'Synopsis of the Newcastle Museum,' published in 1827. His museum, including his collection of birds, which, it is said, cost him several thousand pounds, formed the basis of the Museum at Newcastle-on-Tyne, and from specimens contained in it were drawn *twelve* of the figures of birds in Brown's 'Illustrations of Zoology,' and *fifty* of Bewick's well-known engravings. This catalogue is interesting for its "rarity" rather than for its "utility," since it contains no descriptions—merely a list in English, Latin, and French, of the species known to the author as British. For this reason, we apprehend, none of Tunstall's names, although published in 1771, that is, subsequently to the 12th edition of Linné's 'Systema,' can be allowed to take precedence of those of a later date to which recognizable descriptions are attached.

For the benefit of those who may not have seen a prospectus of "The Willughby Society," we may state that the annual subscription is £1, payable to the Secretary, Mr. F. Godman, 10, Chandos Street, Cavendish Square; that every member of the Society is entitled to one copy of each work printed in the year for which he shall subscribe (it being estimated that on an average three works per annum will probably be issued), and that copies are issued to members only.

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*A List of the Vertebrated Animals now or lately living in the Gardens of the Zoological Society.* 7th Edition. Demy 8vo, pp. 550, with 48 Illustrations. Printed for the Society, and sold at their House in Hanover Square. 1880.

THIS so-called "List," the first edition of which appeared in 1862, has grown into a very useful book of reference, for it not only enumerates all the animals which have been received from time to time by the Zoological Society, but also contains an index, as it were, to papers in the 'Transactions' and 'Proceedings' in which, as regards many of them, important information may be found.

The number of species of each class of Vertebrates included in the present edition of the catalogue is stated to be:—Mammals, 615; Birds, 1329; Reptiles, 257; Batrachians, 41; Fishes, 83; Total, 2325. The greatest additions have been made in the first three classes; only two species of Batrachians and none of Fishes having been added since the issue of the last edition in 1877.

In one respect only do we find this catalogue defective; it does not inform us with any degree of certainty whether any specimen of a given species may be found in the Society's Gardens at the present time. We are well aware of the difficulty which must arise in attempting to afford information of this kind, for an animal which may be living when the catalogue is revised for the printer may be dead by the time the volume is ready for publication. Nevertheless, in cases where animals once in the Gardens are known to be lost to the Society by *death* or *exchange*, we think it would be desirable to express the fact of their non-existence by the addition of the letters *d* or *e*, as the case may require, in order that enquirers may judge what are their chances of finding a given species before making a journey to the Gardens expressly to see it. It would then be understood that all specimens not so marked were believed to be living at the date of revision of the catalogue.

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